



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL MARINE FISHERIES SERVICE

Southwest Region  
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MEMORANDUM FOR: Scientific Research Permit No. 1407

FROM: Rodney R. McInnis *Rodney R McInnis*  
Acting Regional Administrator

SUBJECT: Addendum to Programmatic Biological Opinion for Scientific Research

## I. CONSULTATION HISTORY

Section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, (ESA) provides the National Marine Fisheries Service (NOAA Fisheries) with authority to grant exceptions to the ESA's "taking" prohibitions for scientific research (see regulations at 50 CFR 222.301 through 222.308, and 50 CFR 224.101 through 224.102). Section 10(a)(1)(A) scientific research or enhancement permits may be issued to Federal or non-Federal entities conducting research or enhancement activities that involve an intentional take of ESA-listed species. Any permitted research or enhancement activities must: (1) be applied for in good faith, (2) if granted and exercised not operate to the disadvantage of the threatened or endangered species, and (3) be consistent with the purposes and policy set forth in section 2 of the ESA (50 CFR 222.303(f)). NOAA Fisheries prepared this addendum to the Central Valley Programmatic Biological Opinion for Scientific Research (Central Valley Research Opinion) signed on September 5, 2003, in compliance with section 7(a)(2) of the ESA, as amended (16 U.S.C. 1536).

On October 1, 2002, the California Department of Fish and Game (DFG) submitted an application for a scientific research permit to take endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley spring-run Chinook salmon (CV spring-run Chinook salmon; *O. tshawytscha*), and threatened Central Valley steelhead (CV steelhead; *O. mykiss*) pursuant to section 10(a)(1)(A) of the ESA, for the Butte and Big Chico Creeks Spring-run Chinook Salmon Life History Investigation. This biological opinion is based on information provided in the permit application package, and other verbal correspondence between NOAA Fisheries biologist Howard Brown and ecologist Rosalie del Rosario, and DFG biologists Paul Ward, Tracy McReynolds, and Clint Garman. NOAA Fisheries published a notice of receipt for the permit application in the *Federal Register* on November 7, 2002 (67 FR 67825). The permit application was also peer reviewed by fishery scientists from Federal and State agencies, non-profit organizations, and academia. Aspects of the project that pertain to threatened Central Valley spring-run Chinook salmon and Central



Valley steelhead were subsequently included in the NOAA Fisheries 2003 biological opinion for exempting DFG's research activities under the 4(d) rule (4(d) Opinion). Therefore, this biological opinion only addresses those aspects of the project that pertain to endangered winter-run Chinook salmon. A complete administrative record for this consultation is on file at the NOAA Fisheries Sacramento Area Office, 650 Capitol Mall, Suite 8-300, Sacramento, California 95814.

## **II. DESCRIPTION OF THE PROPOSED ACTION**

NOAA Fisheries proposes to issue a Scientific Research Permit No. 1407 (Permit 1407) to DFG, pursuant to section 10(a)(1)(A) of the ESA, for take of endangered Sacramento River winter-run Chinook salmon that occurs while conducting the Butte and Big Chico Creeks Spring-run Chinook Salmon Life History Investigation. The goal of the study is to provide baseline population information for spring-run Chinook salmon to evaluate restoration efforts in Butte and Big Chico Creeks and to provide information useful for managing and recovering the species. A description of the project, as it pertains to spring-run Chinook salmon and steelhead, is included in the 4(d) Opinion under project no. 77.

During the study, juvenile winter-run Chinook salmon will be captured in a rotary screw trap (RST) that is located within the Sutter Bypass portion of lower Butte Creek. Therefore, this document focuses on aspects of the project that pertain to the capture of juvenile winter-run Chinook salmon. Permit 1407 would be in effect for five calendar years following the date of issuance, and subject to the limitations of the ESA and the regulations in 50 CFR parts 222, 223, and 224, for the period stated on the permit, unless it is modified, suspended or revoked sooner.

### **A. Project Activities**

Outmigrating winter-run Chinook salmon will be trapped in an eight-foot diameter RST within the Sutter Bypass while conducting the Butte and Big Chico Creeks Spring-run Chinook Salmon Life History Investigation. Bypass trapping sites may vary annually depending upon access and water conditions (*i.e.*, flood flows) at each site, but will be limited to sites within the Sutter Bypass. The RST will be oriented with the opening of the trap cone facing upstream into the stream flow. As fish migrate downstream toward the trap, they will be directed through the cone and into a stationary live box. Each RST will be connected to an upstream stationary object with a 0.25-inch diameter steel cable, with RST placement adjusted regularly to allow for safe operation and access as well as to maximize sampling efficiency.

The RST will be fished 24 hours per day, seven days per week, and will be checked at least daily throughout the juvenile salmonid outmigration period (*i.e.*, generally October through July). Traps will be checked at more frequent intervals when debris loads or stream flows are high. Fish will be netted from the trap live-well and immediately placed into buckets of fresh Butte Creek water. Salmonids will be immediately separated from other species, segregated into

separate buckets, and processed. Processing involves placing the fish into a bucket containing a weak, standardized solution of tricaine methanesulfonate (MS-222). Immediately after fish are immobilized by the MS-222, fish will be placed on a wetted plexiglass measuring board, measured to the nearest millimeter fork length, transferred to a wetted container on an electronic scale and weighed to the nearest gram. After processing, and upon resumption of normal swimming behavior, and buoyancy control (*i.e.*, approximately ten minutes) fish will be released downstream of the trapping site.

Captured salmon will be visually inspected for adipose fin clips and any other marks. Adipose fin-clipped fish will be euthanized in MS-222, placed in a whirl-pak bag marked with identification information, and placed on ice in a cooler and transferred to a DFG freezer in Chico, California.

### **B. Measures to Reduce the Impacts of the Study**

To minimize juvenile injury and mortality, traps will be checked a minimum of once daily and more often as increases in debris loads or other physical stressors warrant. Trapping may be suspended during high flows, warm water temperatures, or as necessary to minimize mortalities. Visual observations of weather conditions, stream flows, fish behavior, and electronic records of water temperature will be used to determine the appropriate conditions to suspend trapping. A permanent DFG staff biologist will be on-call during the sampling season to monitor and direct activities as conditions warrant.

### **C. Requested Amount of Take**

DFG anticipates both lethal and non-lethal take of Sacramento River winter-run Chinook salmon. The project may result in an annual estimated capture and handling of up to 6,000 naturally-produced juvenile winter-run Chinook salmon, and an annual estimated lethal take of 60 naturally-produced juvenile winter-run Chinook salmon. Non-adipose fin-clipped winter-run Chinook salmon will be distinguished from other Chinook salmon races using length-at-date criteria (Fisher 1992). The project may also result in an annual capture and lethal take of up to 40 juvenile winter-run Chinook salmon produced at the Livingston Stone National Fish Hatchery. These fish are collected for coded wire tag extraction because they have adipose fin clips. The total requested non-lethal take is 6,000 winter-run Chinook salmon, and the total requested lethal take is 100 winter-run Chinook salmon.

### **D. Description of the Action Area**

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). On Butte Creek, the action area extends from the uppermost extent of the study area, at the Quartz Bowl Pool, downstream to the lowermost RST in the Lower Sutter Bypass, near the confluence of the Feather River at Verona, California. On Big Chico Creek, the action area extends from the

uppermost extent of the study area at the Higgins Hole, downstream to the location of the RST at the Bidwell Municipal Golf Course, near Chico, California. This area encompasses the entire study area of the Butte and Big Chico Creeks Spring-run Chinook Salmon Life History Investigation, although Sacramento River winter-run Chinook salmon inhabit only the Sutter Bypass portion.

### **III. STATUS OF THE SPECIES AND CRITICAL HABITAT**

The issuance of Permit 1407 may potentially affect Sacramento River winter-run Chinook salmon. The recently issued Central Valley Research Opinion describes the status of the Sacramento River winter-run Chinook salmon Evolutionarily Significant Unit (ESU) and its designated critical habitat. The current status of winter-run Chinook salmon, based on their risk of extinction, has not significantly improved since the species were listed (NOAA Fisheries 2003). Although the number of Sacramento River winter-run Chinook salmon has increased in the last six years, the ESU remains at risk of extinction. Sacramento River winter-run Chinook salmon run size declined from a high of approximately 118,000 fish in 1969 to a low of fewer than 200 fish in 1994, and has recently increased to over 9,000 fish in 2002 (DFG 2002).

As discussed in the Central Valley Research Opinion, factors affecting Sacramento River winter-run Chinook salmon and winter-run Chinook salmon critical habitat include: (1) dam construction that blocks previously accessible habitat; (2) water development activities that affect water quantity, water quality, and hydrographs; (3) land use activities such as agriculture, flood control, urban development, mining, and logging; (4) hatchery operation and practices; (5) harvest activities; (6) ecosystem restoration actions; (7) natural conditions; and (8) scientific research. Large dams are present on almost every major tributary to the Sacramento River, and block access to the upper portions of watersheds that represent approximately 80 percent of historical habitat. Water diversions directly entrain fish, and can affect habitat for example by reducing wetted area and causing water temperatures to increase. Runoff from agricultural, urban, and other sources contains pollutants and suspended sediment, which affects water quality. Hatchery fish can compromise the genetic integrity of wild stocks, and fishing pressure on wild stocks can increase during years of high hatchery production. Habitat restoration projects can temporarily cause disturbance and increased suspended sediment in waterways, but ultimately may increase habitat abundance and complexity, stabilize channels and streambanks, increase spawning gravels, decrease sedimentation, and increase shade and cover for salmonids. Cycles in ocean productivity and drought conditions can have corresponding effects on salmonid life history parameters such as growth, recruitment, and mortality. Scientific research can lead to harm, harassment, and death of listed salmonids, but generally is thought to affect only a small number of fish in this manner. The knowledge gained from scientific research may lead to improved management of listed ESUs, increased population sizes, and consequently increased likelihood of survival and recovery.

There is no designated critical habitat for winter-run Chinook salmon within the action area, and the research activities described in this document do not result in any changes or effects to salmonid habitat including critical habitat for Sacramento River winter-run Chinook salmon. Therefore, critical habitat is not likely to be affected by issuance of Permit 1407 and is not considered further in this document.

#### **IV. ENVIRONMENTAL BASELINE**

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species within the action area. The environmental baseline "includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process" (50 CFR 402.02). A detailed discussion of the factors affecting winter-run Chinook salmon is provided in section V (*Environmental Baseline*) of the Central Valley Research Opinion.

##### **A. Status of Species within the Action Area**

Butte and Big Chico Creeks do not contain spawning populations of Sacramento River winter-run Chinook salmon. Therefore, the status of the Sacramento River winter-run Chinook salmon population ESU is not closely tied to conditions within the action area, but can be taken from the general population status provided in the previous section. However, high Sacramento River flows divert emigrating juvenile Chinook salmon in to the lower Butte Sink and Sutter Bypass. Juvenile winter-run Chinook salmon have also been found rearing in lower reaches of Big Chico Creek and its lower tributaries, but have not been found as far upstream as the Chico Municipal Golf Course (Maslin *et al.* 1999).

Sacramento River flows in excess of approximately 22,000 cubic feet per second (cfs) are diverted into the lower Butte Sink and Sutter Bypass via overflows from the Tisdale, Colusa, and Moulton weirs (Butte Creek Watershed Conservancy 1999). During these flows, the Sutter Bypass functions as a migratory corridor for juvenile winter-run Chinook salmon (U.S. Fish and Wildlife Service [FWS] 2000). Winter-run Chinook salmon are captured in DFG RSTs in the Sutter Bypass during winter and spring months (DFG 2001). DFG estimates that since 1999, between 31 and 5,361 juvenile winter-run Chinook salmon have been captured in project RSTs. The total abundance and relative proportion of the juvenile winter-run Chinook salmon population that migrates through the Sutter Bypass is not known, but probably varies depending on the overflow frequency of the Sacramento River at the Tisdale, Colusa, and Moulton weirs.

## **B. Factors Affecting the Species Within the Action Area**

Within the Sutter Bypass, winter-run Chinook salmon are affected by instream flows, agricultural practices, and riparian and flood plain habitat conditions. Instream flows affect salmon by influencing migration timing. Agricultural practices affect salmon by entraining juveniles at unscreened water diversions, and by introducing agricultural contaminants through irrigation return flows. The extensive riparian habitat and flooded lands of the Sutter Bypass provide important rearing areas for outmigrating Chinook salmon during high water years (FWS 2000).

## **V. EFFECTS OF THE PROPOSED ACTION**

Pursuant to section 7(a)(2) of the ESA (16 U.S.C. 1536), Federal agencies are directed to ensure that their activities are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. This biological opinion tiers to the Central Valley Research Opinion and assesses the effects of issuing Permit 1407 on Sacramento River winter-run Chinook salmon. The Butte Creek Spring-run Chinook Salmon Life History Investigation is likely to take federally-listed winter-run Chinook salmon through capturing and killing winter-run Chinook salmon at a RST in the Sutter Bypass.

Regulations that implement section 7(b)(2) of the ESA require biological opinions to evaluate the direct and indirect effects of Federal actions and actions that are interrelated with or interdependent to the Federal action to determine if it would be reasonable to expect them to appreciably reduce listed species' likelihood of surviving and recovering in the wild by reducing their reproduction, numbers, or distribution (16 U.S.C. 1536; 50 CFR 402.02). Section 7 of the ESA and its implementing regulations also require biological opinions to determine if Federal actions would appreciably diminish the value of critical habitat for the survival and recovery of listed species (16 U.S.C. 1536).

### **A. Project Specific Effects**

The Butte and Big Chico Creeks Spring-run Chinook Salmon Life History Investigation will result in the capture, handling, harm, and killing of juvenile Sacramento River winter-run Chinook salmon. Fish are expected to be incidentally captured in a RST and may be harmed or killed from handling, or if they become entangled in the trap or wedged into creases of the live-box. Debris buildup within the RST can also kill or injure fish if the traps are not monitored and cleared on a regular basis, and fish caught in traps are vulnerable to in-trap predation by other fish and to predation by mammals, birds, or reptiles that are able to enter the trap. Sampling protocols, and capture and handling procedures described in section II (*Description of the Proposed Action*) will minimize the stress and mortality of captured fish. Adherence to these procedures during previous years of study have maintained capture and handling-related mortalities to below one percent. Because all adipose fin-clipped fish are collected and killed for

coded wire tag extraction, overall winter-run mortality is slightly higher (*i.e.*, less than two percent).

The requested amount of take for winter-run Chinook salmon at the Sutter Bypass RST is not expected to result in a significant effect at the scale of the ESU because the anticipated mortality rates are low, and both the capture and mortality levels are low relative to the overall abundance of the species. The NOAA Fisheries Juvenile Production Estimate (JPE) measures the relative abundance of juvenile winter-run Chinook salmon entering the Sacramento-San Joaquin Delta based on adult carcass counts (NOAA Fisheries, unpublished data). From 1999 to 2002, the JPE ranged between 449,813 and 2,136,747. By comparison, the requested mortality levels represent between 0.02 and 0.005 percent of the JPE. The project will result in up to 0.35 fewer returning adults per year, based on an average freshwater return rate of 0.35 percent (FWS 2001).

## **B. Beneficial Effects of Issuing the Permit**

The purpose of this study is to evaluate the timing and relative abundance of juvenile anadromous salmonids, particularly Central Valley spring-run Chinook salmon. However, because Sacramento River winter-run Chinook salmon emigrate through the Sutter Bypass during high water events, they are likely to be captured in the RST. Data from the capture of these fish will provide life history information, such as emigration timing, that can be used to adaptively manage Sacramento-San Joaquin Delta water exports by the State Water Project and the Central Valley Project.

## **VI. CUMULATIVE EFFECTS**

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operation of hatcheries, water diversions, and some land management activities, will be reviewed through separate section 7 consultation processes and not considered here. Similarly, non-Federal actions that require authorization under section 10 will be evaluated in separate section 7 consultations and not considered here. A general summary of potential cumulative effects that may affect Sacramento River winter-run Chinook salmon within the action area is described in the Central Valley Research Opinion. These include ongoing agricultural and urban activities that likely will continue to affect stormwater runoff patterns and water quality in the action area, and future population growth that will result in new urban development and increased disturbance of waterways and riparian areas, as well as stormwater and water quality impacts.

## **VII. CONCLUSION**

After reviewing the best scientific and commercial data available, the current status of endangered Sacramento River winter-run Chinook salmon, the environmental baseline for the action area, the effects of the proposed Butte and Big Chico Creeks Spring-run Chinook Salmon Life History Investigation, and the cumulative effects, it is NOAA Fisheries' biological opinion that the issuance of Permit 1407 is not likely to jeopardize the continued existence of the above listed species, and is not likely to destroy or adversely modify designated critical habitat.

## **VIII. INCIDENTAL TAKE STATEMENT**

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, kill, trap, capture or collect, or to attempt to engage in any such conduct of listed species of fish or wildlife without a special exemption under the ESA. NOAA Fisheries defines the term "harm" as an act which kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the Act provided that such taking is in compliance with this Incidental Take Statement.

The issuance of Permit 1407 authorizes intentional take of Sacramento River winter-run Chinook salmon associated with the Butte and Big Chico Creeks Spring-run Chinook Salmon Life History Investigation. The action of issuing Permit 1407 does not anticipate incidental take of endangered or threatened species. This opinion does not authorize any taking of a listed species under section 10(a) or immunize any actions from the prohibitions of section 9(a) of the ESA.

## **IX. REINITIATION OF CONSULTATION**

This concludes formal consultation on the proposed issuance of Permit 1407. As provided in 50 CFR 402.16, reinitiation of formal consultation is required if: (1) the amount or extent of taking specified in any incidental take statement is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the action is subsequently modified in a manner that causes an effect to the listed species that was not considered in the biological opinion, or (4) a new species is listed or critical

habitat is designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

## **X. LITERATURE CITED**

- Butte Creek Watershed Conservancy. 1999. Butte Creek Watershed project final existing conditions report. (<http://buttecreekwatershed.org/ecr/new/toc.htm>)
- California Department of Fish and Game. 2001. July 11, 2001, letter from Paul Ward (DFG) to Nancy Chu (NOAA Fisheries) transmitting annual reports pursuant to section 10 Permit 11025, Study #3.
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- U.S. Fish and Wildlife Service. 2000. Draft programmatic environmental assessment, anadromous fish restoration actions in the Butte Creek Watershed. February 2000. Stockton, California.
- U.S. Fish and Wildlife Service. 2001. Biological assessment of artificial propagation at Coleman National Fish Hatchery and Livingston Stone National Fish Hatchery: program description and incidental take of Chinook salmon and steelhead trout. Red Bluff, California.